

ABSTRACT OF THE DISCLOSURE

An optical interleaving switching method and apparatus. In one aspect of the present invention, the disclosed apparatus includes first and second multi-mode interference (MMI) coupling devices disposed in a semiconductor substrate. Each of the first and second MMI coupling devices include first and second inputs and first and second outputs. A first optical coupler having a first optical path length is included. The first output of the first MMI coupling device is optically coupled to the first input of the second MMI coupling device through the first optical coupler. A second optical coupler having a second optical path length is also included. The second output of the first MMI coupling device is optically coupled to the second input of the second MMI coupling device through the second optical coupler. The first optical path length of the first optical coupler is different than the second optical path length of the second optical coupler. In another aspect of the invention, a 2 x 2 optical switch is optically coupled to the inputs and/or outputs of the first and/or second MMI coupling devices providing multiplexing/demultiplexing and switching functionality for multi-channel optical input and/or output beams.